Group Exercise 1 – Indicator Testing

At least fifteen different water quality parameters can indicate the presence or origin of an illicit discharge. Today you will be working in small groups to conduct some commonly used water quality tests when doing IDDE investigations: ammonia, potassium, conductivity, pH and fluoride .

Potassium Test

Most industrial discharges can consistently be identified by extremely high potassium levels. However, it should be used in combination with other parameters, (e.g. conductivity or hardness) to identify specific industrial types or operations. Threshold values that indicate potential industrial discharges vary by region and should be adjusted based on the community you are working in. For the purpose of this exercise, a threshold value of >20 ppm is considered an indicator of industrial discharge.

Task: You will be provided with two water quality samples and will follow the instructions below to conduct the potassium test for each sample. One sample is tap water (dyed brown) and the other sample is diluted prune juice (yes, you read that right, prune juice). The prune juice is high in potassium and will be used as a surrogate for an industrial discharge.

Calibrate the Potassium Meter
1. Open the sensor cover and wipe the sensor pad with deionized water and a Kimwipe.
2. Place several drops of the STD solution onto the sensor pad. Then adjust the STD dial (at the top of the meter) so that the display reads 20x100. Clean the sensor with deionized water.
3. Place several drops of the SLOPE solution onto the sensor and adjust the SLOPE volume (use the end of the plastic tongs and turn the small screw underneath the flap on the front of the unit) so that the display reads 15x10. Clean the sensor with deionized water. You are now ready to start sampling.

How to Measure
1. Place a few drops of the sample onto the sensor pad.
2. Clean the sensor with deionized water between samples.

Tips
- When placing the calibrating liquids or sample on the sensor pad, make sure that the liquid covers both the black round sensors on the pad.
- Make sure to read the appropriate units (i.e, x100, x10, or x1 next to the read out).

Conductivity / pH test

Use either the conductivity or pH probe (depending which one is on your table) to take a measurement. Simply hold the probe in the sample until the reading stabilizes and record below. Generally, conductivity >2,000 µS and/or pH < 5 are indicators of industrial discharges.

	Sample A	Sample B
Potassium (ppm)		
pH or conductivity (µS)		
Prune Juice or Tap Water?		

Ammonia Test

Ammonia is a single parameter indicator that has been used by some communities with widespread or severe sewage contamination. An ammonia concentration of greater than 0.1 mg/L indicates potential sewage contamination.

Task: You will be provided with two water quality samples and will follow the instructions below to conduct the ammonia test for each sample. One sample is tap water and the other sample is diluted ammonia. The diluted ammonia is used as a surrogate for sewage contaminated water.

How to Measure

- Rinse the cuvet 3 times with sample water.
- Fill the cuvet with 10 ml of sample, replace the cap and wipe the cuvet dry with a Kimwipe.
- Insert the cuvet into the colorimeter being sure to align the index line on the cuvet with the arrow on the meter. Close the lid.
- Press Read to turn the meter on.
- Press ZERO and hold for 2 seconds until the display to show "BLA" (for blank).
- Remove the cuvet.
- Add 8 drops of the first reagent. Replace the cap and swirl the solution. Add 1 ml of the second reagent using the pipet. Replace the cap and swirl the solution.
- Wipe the cuvet dry and wait for 5 minutes.
- Reinsert the cuvet into the meter.
- Press READ and record your results in the table below.
- Empty the sample/reagent mixture into the bottle labeled Waste. Then rinse the cuvet 3 times with distilled water so that it is ready for the next sample.

Tips

- **ALWAYS WEAR SAFETY GOGGLES AND LATEX GLOVES WHEN HANDLING THE REAGENTS.**
- Make sure to zero the meter with each sample.

Record your results in the table below.

	Sample C	Sample D
Ammonia (mg/L)		
Diluted Ammonia or Tap Water?		

Fluoride Test

Fluoride is a great indicator of potable water in communities that fluoridate their water. Chlorine may also be used but because chlorine volatilizes very quickly and its presence can only be detected when present in large quantities, it is not as reliable an indicator as fluoride. Fluoride concentrations >0.25 mg/l may indicate potable water; a higher threshold may be established in communities with high background levels of fluoride.

Task: You will be provided with two water quality samples and will follow the instructions below to conduct the fluoride test for each sample. One sample is tap water and the other sample is stream water.

How to Measure

- Rinse the unmarked cuvet 3 times with sample water.
- Fill the unmarked cuvet with 10 ml of sample and the marked cuvet with 10 ml of deionized water (this will be the standard).
- Add 2 ml of fluoride reagent to each cuvet using the provided pipet.
- Replace the cap and shake each cuvet gently. Wait for two minutes.
- Turn the meter on and place the standard into the meter; ensure that the notch on the cap is positioned securely in the groove.
- Press ZERO and the display will show "-0.0-".
- Remove the cuvet.
- Place the sample in the meter and briefly press read/>/timer.
- Record your results in the table below.
- Empty the sample/reagent mixture into the bottle labeled Waste. Then rinse the cuvet 3 times with distilled water so that it is ready for the next sample.

Tips

- **ALWAYS WEAR SAFETY GOGGLES AND LATEX GLOVES WHEN HANDLING THE REAGENTS.**
- Make sure to zero the meter with each sample. The standard can be used for multiple sample readings.

Record your results in the table below.

	Sample E	Sample F
Fluoride (mg/L)		
Stream Water or Tap Water?		